



POSITION: Postdoc in Complex Metal Alloys for Hydrogen Storage and Processing

JOB ID: 697097

MANAGER: Christopher Shaddix

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DEPARTMENT DESCRIPTION

The Energy Materials Physics Department is a multidisciplinary research organization specializing in the synthesis and characterization of novel materials for energy and national security applications. We seek to understand and engineer materials that enable advanced energy technologies by linking atomic scale structure, defects, and interfaces to macroscopic hydrogen isotope retention, transport properties, and material performance in extreme environments. Our work encompasses discovery and optimization of materials for hydrogen storage and separations, as well as development of plasma-facing and containment materials for next generation fusion and fission reactors. We also study plasma-materials interactions using state-of-the-art research facilities and employ surface sensitive diagnostic techniques to probe composition and structure in the outermost atomic layers, and use ion implantation to tailor near surface chemistry and defect populations. We also conduct material exposure tests and study the near-surface plasma physics at the US National Tokamak Research facility in San Diego.

JOB DESCRIPTION

We are seeking a postdoctoral researcher to probe hydrogen effects in compositionally complex metal alloys derived from earth-abundant elements, with an emphasis on hydrogen storage and processing. The selected applicant will develop novel materials for hydrogen purification, separation, storage, and compression via high-throughput synthesis of metal alloys using additive manufacturing and automated arc-melting platforms to rapidly explore wide compositional spaces. Comprehensive characterization will include in situ diffraction and spectroscopy methods, with particular focus on structural refinement via X-ray crystallography, neutron diffraction, and pair distribution function (PDF) analysis. This research is driven by the national need for durable, high-performance hydrogen separation storage materials capable of efficient and reliable operation under realistic industrial conditions, enabling cost-effective separation and purification of hydrogen and hydrogen isotopes.

QUALIFICATIONS WE REQUIRE

- PhD in chemistry, metallurgy, materials science, or related field
- Expertise in synthesis of new materials and alloys and their structural characterization
- Experience with alloy synthesis, glove-box techniques, and characterization techniques

QUALIFICATIONS WE DESIRE

- Expertise in alloy synthesis techniques using arc melting, induction melting, or additive manufacturing
- Familiarity with advanced characterization techniques
- Experience with materials-based hydrogen separations, storage, and/or compression
- Demonstrated record of high technical achievement and the ability to conduct creative, independent research
- Excellent interpersonal and communication skills

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